CLAIMS

What is claimed is:

1. A wafer-level package, comprising:

a first wafer comprising a bonding pad;

an optoelectronic device on the first wafer; and

a second wafer comprising a gasket, the second wafer being attached to the first wafer by a bond between the gasket and the bonding pad.

2. The package of claim 1, wherein the second wafer comprises a mirror for reflecting a light from the optoelectronic device through the first wafer.

3. The package of claim 1, wherein the first wafer further comprises a contact pad, the package further comprising a via contact through the second wafer connected to the contact pad.

4. The package of claim 1, wherein the second wafer defines a cavity for accommodating the optoelectronic device.

5. The package of claim 1, further comprising a bonding layer over the gasket.

6. The package of claim 5, wherein the bonding layer and the bonding pad comprise gold.

7. The package of claim 6, wherein the bond between the gasket and the bonding pad is a thermocompression bond.

8. The package of claim 7, further comprising a metal barrier layer between at least one of (1) the bonding layer and the gasket, and (2) the bonding pad and the first wafer.

9. The package of claim 8, wherein the metal barrier layer is selected from the group consisting of (a) titanium tungsten/titanium tungsten nitrogen oxide/titanium tungsten, (b) titanium/platinum, (c) chromium/platinum, (d) tungsten silicon nitride, (e) titanium silicon nitride, (f) silicon dioxide/titanium, (g) silicon dioxide/chromium, and (h) silicon dioxide/titanium tungsten.

10. The package of claim 1, wherein the bond between the gasket and the bonding pad is selected from the group consisting of a reaction bond and a solder bond.

11. The package of claim 1, wherein the gasket comprises a treaded surface.

12. The package of claim 1, wherein the optoelectronic device is selected from the group consisting of an edge-emitting laser and a vertical cavity surface-emitting laser (VCSEL).

13. The package of claim 1, wherein the first wafer further comprises at least one of an active circuit and a passive circuit.

14. The package of claim 1, wherein the first wafer further comprises an integrated lens.

15. The package of claim 14, wherein the integrated lens comprises a diffractive optical element.

16. The package of claim 1, wherein the second wafer comprises an integrated lens and the optoelectronic device emits a light through the integrated lens.

17. The package of claim 16, wherein the integrated lens comprises a diffractive optical element.

18. A method for forming a wafer-level package, comprising:

forming a bonding pad on a first wafer;

locating an optoelectronic device on the first wafer;

forming a gasket on a second wafer; and

attaching the second wafer to the first wafer with a bond between the gasket and the bonding pad.

19. The method of claim 18, wherein said locating the optoelectronic device comprises attaching the optoelectronic device on the first wafer.

20. The method of claim 18, wherein said locating the optoelectronic device comprises forming the optoelectronic device on the first wafer.

21. The method of claim 18, further comprising forming a mirror in the second wafer for reflecting a light from the optoelectronic device through the first wafer.

22. The method of claim 18, further comprising:

forming a contact pad on the first wafer; and

forming a via contact through the second wafer and coupled to the contact pad.

23. The method of claim 18, further comprising forming a cavity in the second wafer for accommodating the optoelectronic device.

24. The method of claim 18, further comprising forming a bonding layer on the gasket.

25. The method of claim 24, wherein the bonding layer and the contact pad comprise gold.

26. The method of claim 25, wherein the bond comprises a thermocompression bond.

27. The method of claim 26, wherein the thermocompression bond comprises pressing the first and the second wafers together using 30 to 120 megapascals of pressure at 320 to 400°C for 2 minutes to 1 hour.

28. The method of claim 26, further comprising forming a barrier metal layer between at least one of (1) the bonding layer and the gasket, and (2) the bonding pad and the first wafer.

29. The method of claim 28, wherein the barrier metal layer is selected from the group consisting of (a) titanium tungsten/titanium tungsten nitrogen oxide/titanium tungsten, (b) titanium/platinum, (c) chromium/platinum, (d) tungsten silicon nitride, (e) titanium silicon nitride, (f) silicon dioxide/titanium, (g) silicon dioxide/chromium, and (h) silicon dioxide/titanium tungsten.

30. The method of claim 18, wherein the bond is selected from the group consisting of a reaction bond and a solder bond.

31. The method of claim 30, wherein the reaction bond comprises pressing the first and the second wafers together using 60 to 120 megapascals of pressure at 300 to 365°C for 5 to 30 minutes.

32. The method of claim 18, further comprising forming a treaded surface on the gasket.

33. The method of claim 18, wherein the optoelectronic device is selected from the group consisting of an edge-emitting laser and a vertical cavity surface-emitting laser (VCSEL).

34. The method of claim 18, further comprising forming at least one of an active circuit and a passive circuit in the first wafer.

35. The method of claim 18, further comprising forming an integrated lens as part of the first wafer.

36. The method of claim 35, wherein the integrated lens comprises a diffractive optical element.

37. The method of claim 18, further comprising forming an integrated lens as part of the second wafer.

38. The method of claim 37, wherein the integrated lens comprises a diffractive optical element.